Research and Evaluation Activities in USDA

From the Food Surveys Research Group, Beltsville Human Nutrition Research Center, Agricultural Research Service

Do People Really Know How Much They Eat?

How well are people able to report amounts of foods they eat? This question forms the basis of research conducted to improve the accuracy of information about the types and amounts of foods eaten by Americans. This information is collected in periodic USDA food consumption surveys that date back to the 1930's. The most recent nationwide dietary survey conducted by USDA is the 1994-96, 1998 Continuing Survey of Food Intakes by Individuals (CSFII).

The USDA has been a leader in the development of methods to help people more accurately recall and report what they eat. Research supported by USDA in the early 1980's demonstrated that, for dietary recalls administered specifically in the home, common household measuring utensils are potentially more helpful than abstract three-dimensional food models.

Food preferences and sizes of food portions have changed over the years. Ethnic foods and one-dish meals have grown in popularity; typical portions served in food establishments are reported to be increasing. For example, larger- or super-sized servings of beverages and french fries have become a mainstay on menus in fast-food restaurants. Many food choices today come in a variety of sizes—from bite-size to fun-size to king-size. Larger portions and the use of multiple servings during a meal add to the complexity, and emphasize the necessity, of collecting amounts accurately. At the same time, foods being consumed in smaller portions by weight- and health-conscious people must also be estimated accurately.

Food Model Booklet

As portions and preferences are changing, so are the methods used to conduct nationwide food surveys. In-home collection of in-person dietary data is not the only means of gathering this type of information about Americans. The Food Surveys Research Group (FSRG) has been conducting research on collecting dietary data by telephone. Telephones provide an economical and valid means for gathering such data if response rates can be maintained by notifying respondents in advance about participating in the study. As part of the research program to adapt new collection methods, FSRG has developed an easy-to-use *Food Model Booklet* that incorporates high-tech graphics and research on how people perceive quantities and on what is and is not helpful.

The *Food Model Booklet* contains 30 life-size pictures ranging from two-dimensional drawings of typical household food containers (e.g., glasses, cups, and bowls) to more creative drawings of geometric shapes (e.g., amorphous mounds, wedges having a moveable arrow to denote sizes, concentric circles, and a grid). In previous CSFII surveys, interviewers used measuring cups and spoons and a ruler to help survey respondents recall portion sizes of foods they ate. With the addition of the *Food Model Booklet*, respondents now have more ways to estimate amounts, thus making it easier for them and more accurate. It also allows for data collection via the telephone.

USDA has placed a priority on improving portion-size estimation aids through an 1890 Capacity Building Grant that was under the direction of Dr. Sandria Godwin at Tennessee State University in collaboration with Dr. Edgar Chambers IV at Kansas State University. The research has focused on identifying the cognitive strategies people use in reporting food amounts and on developing novel measurement aids. Aids were found to help in formulating memory recall and in setting boundaries for visualization and comparison. The research has shown that people prefer aids that are similar in size and shape to actual household containers—a finding that FSRG has implemented in developing the *Food Model Booklet*. The research also has demonstrated that estimates of relative size (i.e., small, medium, and large) are effective for some difficult-to-measure foods.

Development of the *Food Model Booklet* involved graphic design and computer power precision to draw the two-dimensional models to life-size depiction and accurate volume capacity. But development did not stop there. An accuracy test was conducted with 264 adults to assess how accurately people estimated amounts of 17 commonly eaten foods such as: spaghetti, pizza, cola, meatloaf, and potato salad. The

participants estimated the amount of each food by using a two-dimensional model from the *Food Model Booklet* and typical measuring aids (including measuring cups and spoons and a ruler). The results: Overall, people estimated serving sizes as well with the *Food Model Booklet* as with other measuring aids. And, estimates improved by about one-third with the "mound" models, compared with the measuring cups.

The *Food Model Booklet* is but one answer to ensuring that respondents can accurately report how much they eat. Dietary recalls were administered in a nationwide pilot study of nearly 800 individuals of all ages. The *Food Model Booklet* was used as one of the measurement aids in addition to measuring cups and spoons and a ruler. Only 17 percent of the food portions reported were estimated by the assistance of the *Food Model Booklet*. Most food portions were reported with descriptions such as "large, medium, thin slice, and can of soda," as well as cups or spoons. In many cases, the name of the item, such as Big Mac® or Fig Newtons®, is directly associated with a known weight, so only the number eaten needs to be reported. Also, many foods come prepackaged with labels showing the quantities. Hence the marketplace is another important source for determining portion sizes.

The *Food Model Booklet* does not rely on providing actual measures or amounts of food. It is designed so that a respondent does not need to know how much of a food he or she consumed in terms of a measurement but rather in terms of visualizing the amount in relation to the model. FSRG has plans underway to make the *Food Model Booklet* more consumer-friendly by including not only all the food models but also including corresponding measures and selected nutrient values for frequently consumed foods. FSRG believes that this consumer publication will be a valuable nutrition education tool for Americans interested in portion sizes and will be responsive to the need for visual references that help Americans identify food amounts.

The New USDA Automated Multiple-Pass Method

The development of the *Food Model Booklet* is only part of the effort to improve dietary surveys that has been underway in FSRG for the past 4 years. An expanded and improved method of questioning that helps survey respondents remember the foods they ate has been completed and automated. The whole dietary interview has been computerized (including the questions, prompts, and details about the food and how it is prepared). The new method is called the USDA Automated Multiple-Pass Method. It relies on a number of built-in cues and specially sequenced questions to help jog the respondents' memory. The *Food Model Booklet* is an integral part of the new method.

The new USDA Automated Multiple-Pass Method will be used in a dietary survey, to be launched in 2002, which will integrate the USDA food survey with the National Health and Nutrition Examination Survey (NHANES) that is directed by the National Center for Health Statistics (NCHS) of the U.S. Department of Health and Human Services. USDA will provide the instrument and be responsible for compiling and processing the dietary data. USDA and NCHS will work cooperatively to release the dietary data from the integrated survey.

Survey Results

Results from the 1994-96, 1998 Continuing Survey of Food Intakes by Individuals are available in several formats:

- The microdata (raw) are available on a two-disk CD-ROM set. The CD-ROM provides complete documentation needed for using the data, including SAS programs to read the data and create system files, and both annual and multi-year sampling weights. The CD-ROM also includes the technical support databases—food codes, nutrient values, and recipes. The CD-ROM is available from the National Technical Information Service at 1-800-553-6847. Accession number PB2000-500027.

- The Web site for the Food Surveys Research Group at www.barc.usda.gov/bhnrc/foodsurvey/home.htmincludes 19 table sets with summary statistical results from the survey, as well as copies of the questionnaires, interviewer manuals, and a report on the design and operation of the survey.

- Formal survey reports are available from the National Technical Information Service at 1-800-553-6847. (Most of the data in these reports are available on the FSRG Web site; however, the formal reports include standard errors not available in all table sets.)

  - ☐ Design and Operation: The Continuing Survey of Food Intakes by Individuals and the Diet and Health Knowledge Survey, 1994-96, NFS Rep. No. 96-1, 264 pp. NTIS Accession No. PB98-137268.*

  - ☐ Food and Nutrient Intakes by Individuals in the United States, by Sex and Age, 1994-96, NFS Rep. No. 96-2, 197 pp. NTIS Accession No. PB99-117251. (Table sets 8, 9, 10, and 12.*)

  - ☐ Food and Nutrient Intakes by Individuals in the United States, by Income, Food Stamp Program Participation, Race, Hispanic Origin and Race, and Region, 1994-96, NFS Rep. No. 96-3, Volumes 1 and 2, 771 pp. NTIS Accession No. PB2000-107886. (Table sets 11, 13, 14, 15, and 16.*)

  - ☐ Results from USDA's 1994-96 Diet and Health Knowledge Survey, NFS Rep. No. 96-4. NTIS Accession No. PB2001-104879. (Table set 19.*)

*Available on the FSRG Web site, as indicated.